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XIII. "Observations made with the Polariscopes during the 'Fox' Arctic Expedition." By DAVID WALKER, M.D., Surgeon to the Expedition,—in a Report transmitted by Sir LEOPOLD MCCLINTOCK. Communicated by Professor STOKES, Sec. R.S. Received March 7, 1860.

The observations made with the polariscopes*, with one exception, were confined to solar halos and parhelia. Several times I tried the instrument when lunar halos appeared, but the light was so faint that only once was I able to make an observation. The direction of the polarization was the same in all the cases observed, namely, in a plane parallel to a line joining the part looked at with the centre of the sun or moon. In several instances the instrument was turned round so as to find the plane of maximum polarization, but it was always found greatest in the parallel or perpendicular plane: when the plane was oblique, no perceptible polarization at all was perceived. The light was never completely polarized, the greatest amount not being more than half; such occurred on 21st of April, and 5th and 6th of May 1859. All the halos observed had a diameter of about 45° : there were some seen of diameter 90° , but the polariscopes were not at hand at the time. Almost always the halos round the moon or sun were more or less prismatic, red internal. The observation on October 10th, 1857, was not on a halo, but the cloud which surrounded the moon at a distance of about $1\frac{1}{2}^\circ$ had circular and prismatic edges; light from these edges was slightly polarized, but not of the same image as in all the other instances.

Moon.

October 7th, 1857.—Polariscopes applied to a halo round the moon, diameter about 45° ; slight polarization; arrow and brighter image

* The polariscopes employed consisted merely of a double-image prism of quartz, formed of two quartz prisms cut in the usual manner and cemented together, which was fixed at the eye-end of a tube about 18 inches long, provided at its other end with a rectangular aperture having its edges parallel and perpendicular to the planes of polarization of the two images, and of such breadth that the two images just touched each other along one edge. The plane of polarization of that image which was polarized in a plane passing through the axis of the instrument, was marked by an arrow at the eye-end, lying in that plane, and placed on the same side of the axis as the image in question.

both being to the left when the instrument was held parallel to a line joining a part of halo to the left of the moon with the moon.

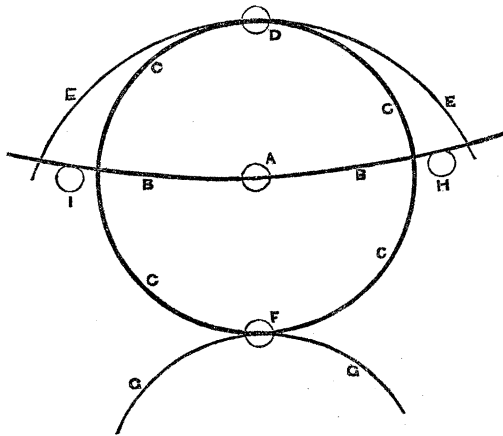
October 10th, 1857.—Polariscope applied to a prismatic luminous haze round the moon, three diameters of moon's radius; slight polarization, the image to the right hand being brighter, mark on eye-end to left hand; instrument held horizontal, looking at the haze to the right of the moon.

Sun.

March 18th, 1858.—Prismatic halo round the sun's diameter about 45° , with two parhelia, one on each side of the sun; instrument applied to the left parhelion; slight polarization, the outer or left image being brighter when the instrument was held in a plane parallel to a line joining the sun and parhelion, the eye-mark and brighter image both to the left.

May 15th, 1858.—Prismatic halo round sun, diameter about 45° , with two parhelia, one on each side. The instrument held in same azimuth as last observation, looking at left parhelion; a little stronger polarization, the outer image being brighter.

May 25th, 1858.—Appearances in neighbourhood of sun and par-



- A. Sun's altitude, $39^\circ 15'$.
- B. Circle running round heavens, 101° diam.
- C. Circle 22° in radius, passing round A and intersecting B.
- D. A parhelion occurring on circle C.
- E. An oval arc, radius horizontally $27^\circ 30'$, perpendicularly 22° .
- F. Parhelion occurring on circle C.
- G. Part of a circle passing through F, $17^\circ 15'$ above horizon.
- H and I. Two parhelia on horizontal circle (101° diameter), each distant from sun $25^\circ 30'$.

helio at 1.45 P.M. :—Sun's altitude $39^{\circ} 15'$. A circle of diameter 101° running round heavens and passing through the sun, intersected by another circle, radius 22° , having the sun for its centre. Another intersection took place at $27^{\circ} 30'$ from the sun, on each side, by an arc (perpendicular), which coincided with the previous circle at an altitude of 22° from the sun. Four parhelia appeared, one on each side of the sun, one above and one below; through the lower one passed part of an arc of another circle. Polariscopes applied to left-side parhelion and also to halo, slight polarization of outer or left image; instrument held in a plane parallel to a line joining parhelion and sun.

July 16th, 1858, 10.40 P.M.—Prismatic parhelia $22^{\circ} 30'$ on each side of sun; altitude 7° . Polariscopes held in a parallel plane; parhelion on left of sun looked at; slight polarization; bright image and eye-mark both to the left hand.

November 8th, 1858, 10 A.M.—Prismatic parhelion distant about 23° from each side of sun; altitude 6° . Polariscopes applied to left image, held horizontally (parallel), eye-mark to left; slight polarization, image to left and further from sun brighter. Instrument held in same plane, but with eye-mark to right, applied to right parhelion; similar slight polarization, image to right and furthest from the sun brighter.

March 30th, 1859, 4 P.M.—Prismatic parhelia about 23° distant from each side of sun. Polariscopes applied to image on left of the sun, held parallel, eye-mark to left; slight polarization, image to left and further from the sun brighter. Instrument held in same plane, but eye-mark to right; slight polarization, image to right and outer being the brighter.

April 21st, 1859, 7 P.M.—Prismatic parhelion and part of halo on each side of sun distant about $22^{\circ} 30'$. Polariscopes applied to left-hand image, held in a parallel plane, eye-mark to left; *medium* polarization, the left or outer image brighter. Instrument held in same plane with eye-mark to right, and applied to right-hand image; similar *medium* polarization, image to right and further from the sun brighter.

May 1st, 1859, 6 P.M.—Prismatic parhelion with part of a halo on each side of sun distant 23° (about). Polariscopes applied to left image, held parallel, eye-mark to left; slight polarization, left or outer image brighter. Instrument held in same plane, eye-mark to

right and applied to right image; slight polarization, outer or right image being brighter.

May 5th, 1859, 8 P.M.—Prismatic parhelion with part of halo on each side of sun distant about $22^{\circ} 30'$. Polariscopes applied to left image, held in a parallel plane, eye-mark to left; *medium* polarization, left or outer image brighter. Instrument held in same plane and applied to right image, eye-mark to right; similar *medium* polarization, outer or right image brighter.

May 6th, 1859, 6.50 P.M.—Prismatic parhelion and part of halo on each side of sun distant $22^{\circ} 20'$. Polariscopes applied to left image and held in a parallel plane, eye-mark to left; *medium* polarization, outer or left image being brighter. Instrument held in same plane, eye-mark to right, and applied to the right parhelion; similar *medium* polarization, right or outer image being brighter.

May 20th, 1859, 8 P.M.—Prismatic arc of halo to left of sun distant about 23° . Polariscopes applied, held in the parallel plane, eye-mark to left; slight polarization, the outer or left image being brighter.

August 7th, 1859, 7.30 P.M.—Prismatic parhelion to right of sun, distant about $22^{\circ} 30'$. Polariscopes applied, held in the plane of a line joining sun and parhelion; a little more polarization than in last observation. Arrow and brighter image both to the right.

XIV. "Notice of 'The Royal Charter Storm' in October 1859."

By Rear-Admiral ROBERT FITZROY, F.R.S. Received June 21, 1860.

(Abstract.)

The author commenced with some remarks on the recent progress of meteorology, on its advances towards precision and consistency as a science, and the comparative certainty and confidence with which it may now be relied on in its practical applications. He adverted also to the measures now systematically adopted by the Meteorological Department of the Board of Trade and by the Admiralty for promoting simultaneous meteorological observations at various places, and for obtaining accurate registration of atmospherical conditions at sea and on land in many parts of the world; and drew attention to